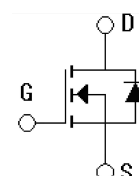
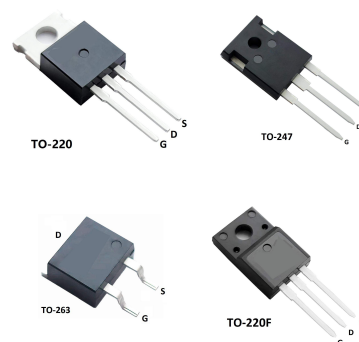


## Features

- Low gate charge
- Low  $C_{RSS}$  (typ 13pF)
- Fast switchin
- 100% avalanche tested
- Improved dv/dt capability
- RoHS product

## Applications

- High frequency switching mode power supply
- Electronic ballast based on half bridge
- LED power supplies



## Absolute Ratings (Tc=25°C)

| Parameter                                    | Symbol                                | Value | Unit |
|----------------------------------------------|---------------------------------------|-------|------|
| Drain-Source Voltage                         | $V_{DSS}$                             | 1000  | V    |
| Drain Current-continuous                     | $I_D$ T=25°C<br>T=100°C               | 12    | A    |
|                                              |                                       | 8     | A    |
| Drain Current-pulse<br>(note 1)              | $I_{DM}$                              | 64*   | A    |
| Gate-Source Voltage                          | $V_{GS}$                              | ±30   | V    |
| Single pulse avalanche<br>energy<br>(note 2) | $E_{AS}$                              | 858   | mJ   |
| Avalanche Current (note 1)                   | $I_{AR}$                              | 12    | A    |
| Repetitive Avalanche<br>Energy(note 1)       | $E_{AR}$                              | 27.7  | mJ   |
| Power Dissipation<br>( SL12N100/T)           | PD<br>TC=25°C<br>Derate above<br>25°C | 272   | W    |
|                                              |                                       | 2.17  | W/°C |
| Power Dissipation<br>( SL12N100K )           | PD<br>TC=25°C<br>Derate above<br>25°C | 100   | W    |
|                                              |                                       | 0.8   | W/°C |
| Power Dissipation<br>( SL12N100F)            | PD<br>TC=25°C<br>Derate above<br>25°C | 68    | W    |
|                                              |                                       | 0.54  | W/°C |

|                                                 |                |          |    |
|-------------------------------------------------|----------------|----------|----|
| Operating and Storage Temperature Range         | $T_J, T_{STG}$ | -55~+150 | °C |
| Maximum Lead Temperature for Soldering Purposes | $T_L$          | 300      | °C |

\*Drain current limited by maximum junction temperature

### Electrical Characteristics( $T_{CASE}=25^{\circ}C$ unless otherwise specified)

| Parameter                                 | Symbol                       | Tests conditions                             | Min  | Type | Max       | Units    |
|-------------------------------------------|------------------------------|----------------------------------------------|------|------|-----------|----------|
| Drain-Source Voltage                      | $BV_{DSS}$                   | $I_D=250\mu A, V_{GS}=0V$                    | 1000 | -    | -         | V        |
| Breakdown Voltage Temperature Coefficient | $\Delta BV_{DSS}/\Delta T_J$ | $I_D=250\mu A$ , referenced to $25^{\circ}C$ | -    | 0.98 | -         | V/°C     |
| Zero Gate Voltage Drain Current           | $I_{DSS}$                    | $V_{DS}=800V, V_{GS}=0V, T_C=25^{\circ}C$    | -    | -    | 1         | $\mu A$  |
|                                           |                              | $V_{DS}=720V, T_C=125^{\circ}C$              | -    | -    | 10        | $\mu A$  |
| Gate body leakage current                 | $I_{GSS}$                    | $V_{DS}=0V, V_{GS}=\pm 30V$                  | -    | -    | $\pm 100$ | nA       |
| <b>On-Characteristics</b>                 |                              |                                              |      |      |           |          |
| Gate Threshold Voltage                    | $V_{GS(th)}$                 | $V_{DS}=V_{GS}, I_D=250\mu A$                | 3.0  | -    | 5.0       | V        |
| Static Drain-Source On-Resistance         | $R_{DS(ON)}$                 | $V_{GS}=10V, I_D=6A, T_C=25^{\circ}C$        | -    | 1.0  | 1.2       | $\Omega$ |
| Forward Transconductance                  | $g_{FS}$                     | $V_{DS}=40V, I_D=6A$ (note 4)                | -    | 9.5  | -         | S        |
| <b>Dynamic Characteristics</b>            |                              |                                              |      |      |           |          |
| Input capacitance                         | $C_{iss}$                    | $V_{DS}=25V, V_{GS}=0V, f=1.0MHz$            | -    | 2150 | 2830      | pF       |
| Output capacitance                        | $C_{oss}$                    |                                              | -    | 189  | 246       | pF       |
| Reverse transfer capacitance              | $C_{rss}$                    |                                              | -    | 13   | 17        | pF       |

### Electrical Characteristics( $T_{CASE}=25^{\circ}C$ unless otherwise specified)

| Parameter                        | Symbol       | Tests conditions                                    | Min | Type | Max | Units |
|----------------------------------|--------------|-----------------------------------------------------|-----|------|-----|-------|
| <b>Switching-Characteristics</b> |              |                                                     |     |      |     |       |
| Turn-On delay time               | $t_{d(on)}$  | $V_{DD}=600V, I_D=12A, R_{GEN}=25\Omega$ (note 4,5) | -   | 53   | 121 | ns    |
| Turn-On rise time                | $t_r$        |                                                     | -   | 116  | 235 | ns    |
| Turn-Off delay time              | $t_{d(off)}$ |                                                     | -   | 97   | 199 | ns    |

|                                                             |          |                                                       |   |      |     |         |
|-------------------------------------------------------------|----------|-------------------------------------------------------|---|------|-----|---------|
| Turn-Off rise time                                          | $t_f$    |                                                       | - | 69   | 171 | ns      |
| Total Gate Charge                                           | $Q_g$    | $V_{DS}=800V, I_D=12A,$<br>$V_{GS}=10V$<br>(note 4,5) | - | 43   | 56  | nC      |
| Gate-Source charge                                          | $Q_{gs}$ |                                                       | - | 15   | -   | nC      |
| Gate-Drain charge                                           | $Q_{gd}$ |                                                       | - | 21   | -   | nC      |
| Drain-Source Diode Characteristics and Maximum Ratings      |          |                                                       |   |      |     |         |
| Diode Forward Voltage<br>(note 3)                           | $V_{SD}$ | $V_{GS}=0V, I_S=12A$                                  | - | -    | 1.4 | V       |
| Maximum Pulsed<br>Drain-Source<br>Diode Forward Current     | $I_{SM}$ | -                                                     | - | -    | 48  | A       |
| Maximum Continuous<br>Drain Source Diode<br>Forward Current | $I_S$    | -                                                     | - | -    | 12  | A       |
| Reverse recovery time                                       | $t_{rr}$ | $V_{GS}=0V,$                                          | - | 539  | -   | ns      |
| Reverse recovery charge                                     | $Q_{rr}$ | $I_S=8A \text{ } dI_F/dt=100A/\mu s$<br>(note 4)      | - | 6.41 | -   | $\mu C$ |

## Thermal Characteristic

| Parameter                                  | Symbol        | Value           |               |               | Unit          |
|--------------------------------------------|---------------|-----------------|---------------|---------------|---------------|
|                                            |               | SL12N100<br>/ T | SL12N100<br>K | SL12N100<br>F |               |
| Thermal Resistance, junction<br>to Case    | $R_{th(j-C)}$ | 0.46            | 1.25          | 1.84          | $^{\circ}C/W$ |
| Thermal Resistance, Junction<br>to Ambient | $R_{th(j-A)}$ | 40              | 62.5          | 62.5          | $^{\circ}C/W$ |

## Order information

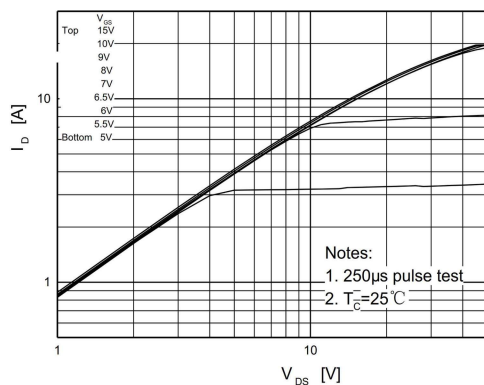
| Order codes | Package | Packaging |
|-------------|---------|-----------|
| SL12N100T   | TO-247  | Tube      |
| SL12N100K   | TO-263  | Tube      |
| SL12N100    | TO-220  | Tube      |
| SL12N100F   | TO-220F | Tube      |

Notes:

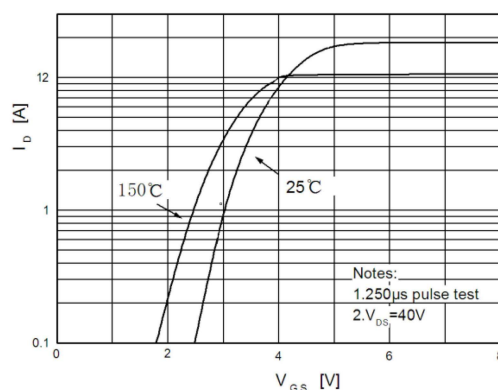
1. Pulse width limited by maximum junction temperature
2.  $L=20mH, I_{AS}=12A, V_{DD}=50V, R_G=25 \Omega$ , Starting  $T_J=25^{\circ}C$
3.  $I_{SD} \leq 12A, di/dt \leq 300A/\mu s, V_{DD} \leq BV_{DSS}$ , Starting  $T_J=25^{\circ}C$
4. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$
5. Essentially independent of operating temperature

## ELECTRICAL CHARACTERISTICS (curves)

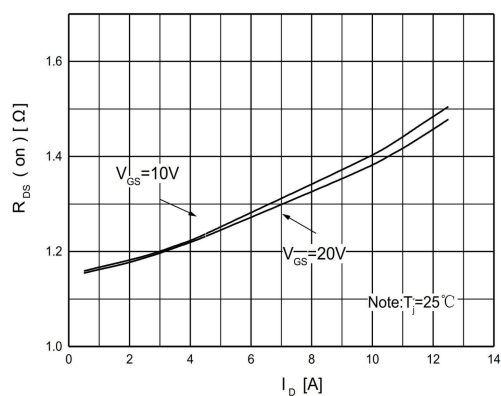
### On-Region Characteristics



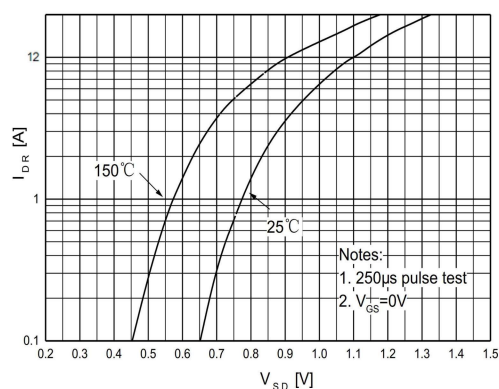
### Transfer Characteristics



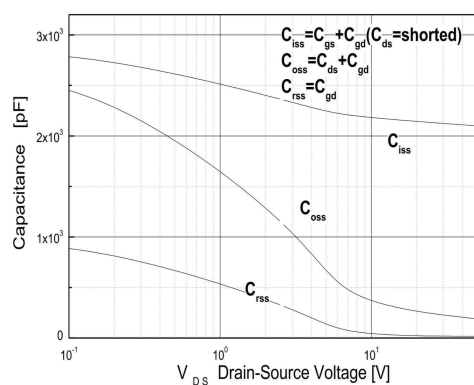
### On-Resistance Variation vs. Drain Current Gate Voltage



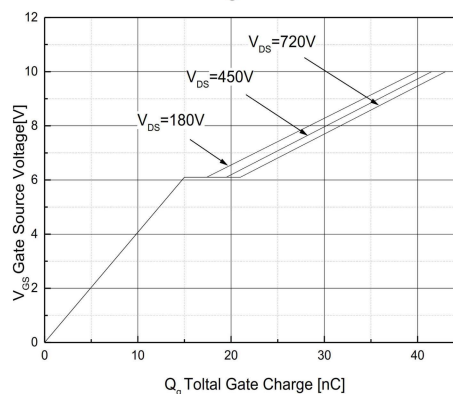
### Body Diode Forward Voltage Variation vs. Source Current and Temperature



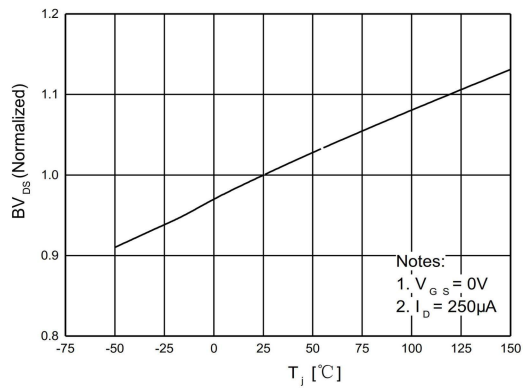
### Capacitance Characteristics



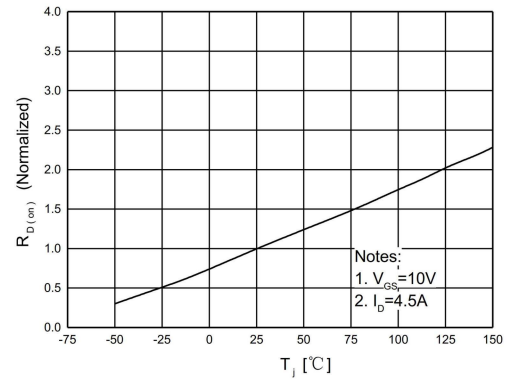
### Gate Charge Characteristics



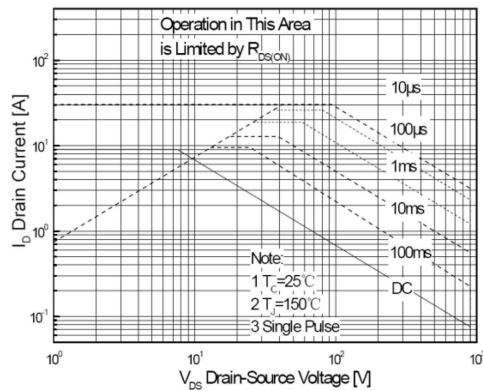
**Breakdown Voltage Variation  
vs. Temperature**



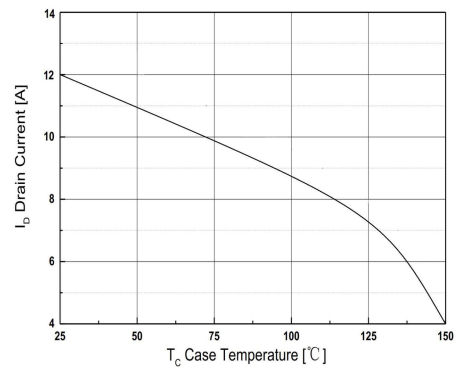
**On-Resistance Variation  
vs. Temperature**



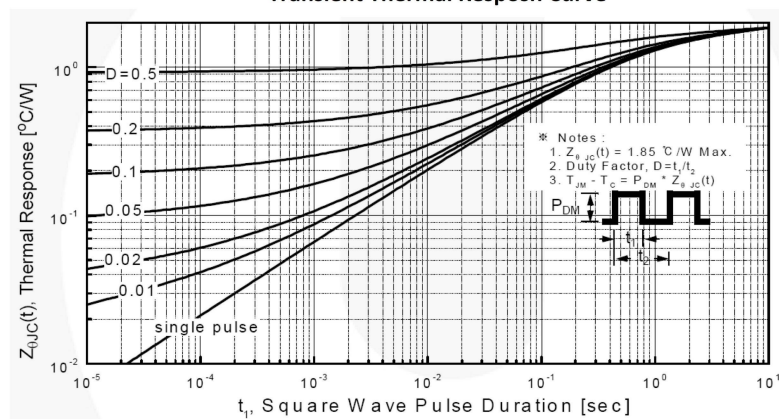
**Maximum Safe Operating Area**



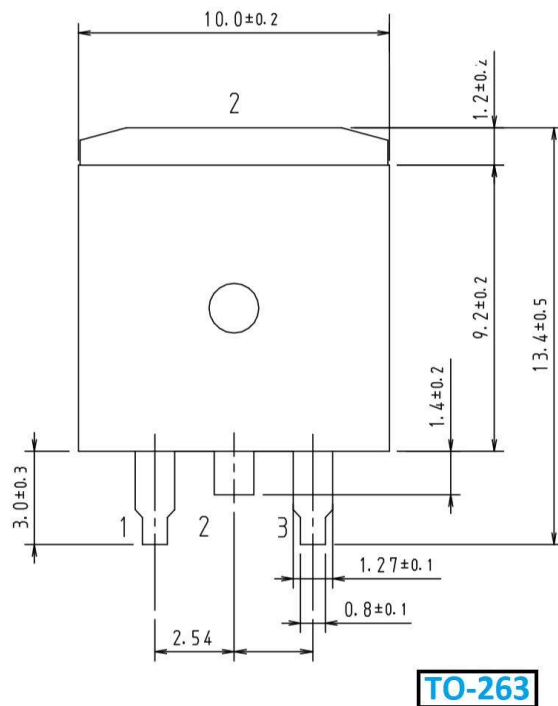
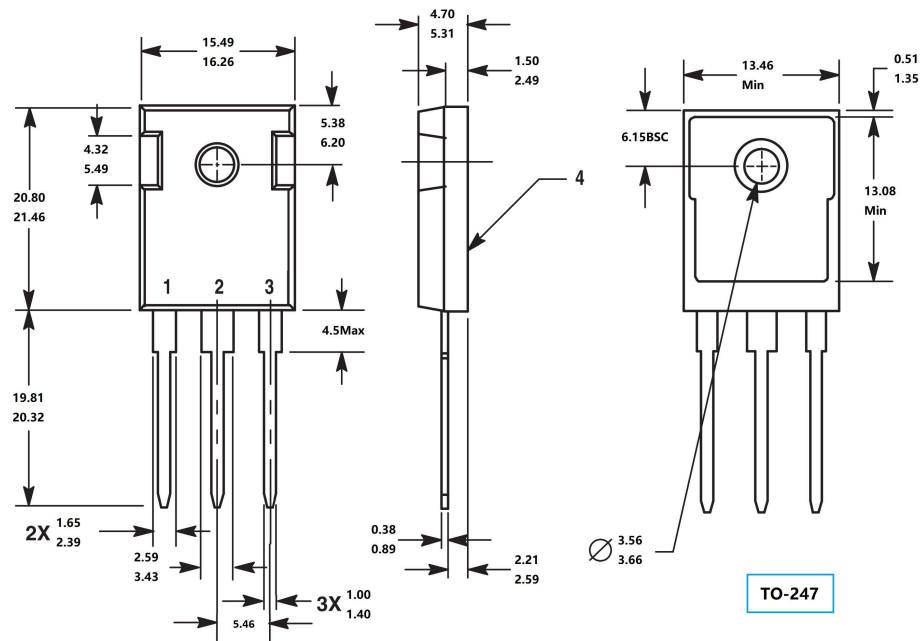
**Maximum Drain Current  
vs. Case Temperature**



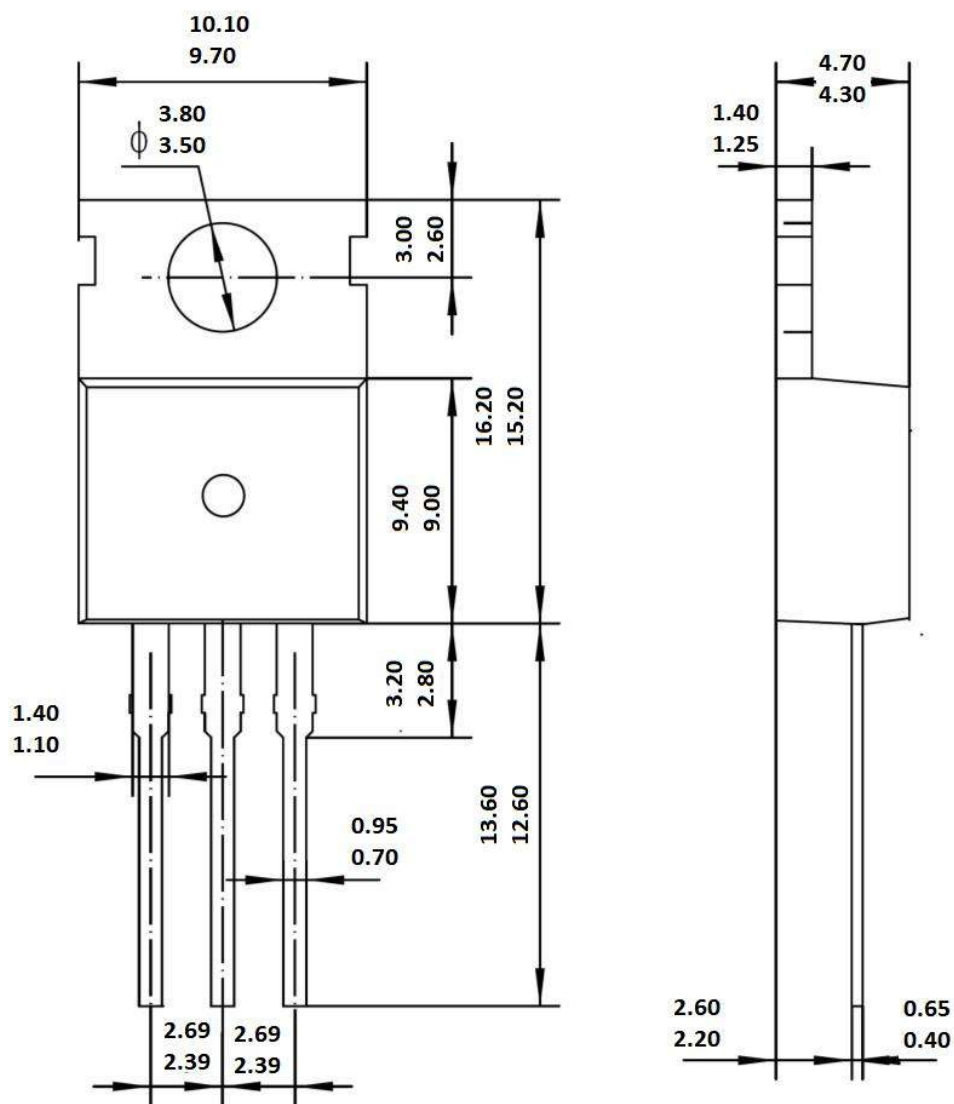
**Transient Thermal Resposn Curve**



## PACKAGE MECHANICAL DATA



Unit:mm



**TO-220**

**Unit: mm**

